

What is claimed is:

1. A disk drive, comprising:
- a housing;
- at least one data storage disk movably interconnected with said housing;
- an actuator arm assembly movably interconnected with said housing by an actuator arm pivot;
- an actuator arm drive assembly interconnected with said actuator arm assembly;
- a transducer interconnected with said actuator arm assembly and disposable in alignment with said at least one data storage disk by said actuator arm drive assembly;
- and
- an actuator arm latch assembly comprising a latch pivot and a first latch member movably mounted on said latch pivot, wherein said latch pivot is disposed in non-parallel relation to said actuator arm pivot.
2. The disk drive of Claim 1, wherein said housing comprises a base plate.
3. The disk drive of Claim 1, wherein said actuator arm assembly is a rotary actuator arm assembly.
4. The disk drive of Claim 1, wherein said transducer is a read/write transducer.
5. The disk drive of Claim 1, wherein said housing comprises a base plate, wherein said first latch member comprises a latch, wherein said first latch member is movable between non-latching and latching positions about said latch pivot, and wherein said latch is disposed further from said base plate when said first latch member is in said latching position versus said non-latching position.

6. The disk drive of Claim 1, wherein said first latch member comprises a first cup and a latch, wherein said actuator arm latch assembly further comprises a first inertial mass that is at least partially disposed within said first cup.

7. The disk drive of Claim 6, wherein said housing comprises a base plate, and wherein said first cup opens at least generally toward said base plate.

8. The disk drive of Claim 6, wherein said first cup comprises an annular sidewall that is disposed about a first reference axis, wherein said annular sidewall comprises a plurality of annular, planar facets having different slopes.

9. The disk drive of Claim 6, wherein said first latch member comprises a second cup, wherein said first and second cups are disposed on opposite sides of said latch pivot.

10. The disk drive of Claim 9, wherein said housing comprises a base plate, and wherein said first cup opens at least generally toward said base plate and said second cup opens at least generally away from said base plate.

11. The disk drive of Claim 1, wherein said at least one data storage disk is movably interconnected with said base within a first reference plane, wherein a second reference plane is perpendicular to said first reference plane, and wherein said actuator arm latch assembly comprises means for latching said actuator arm assembly both when said disk drive is exposed to a force having at least a primary component that is within said first reference plane and when said disk drive is exposed to a force having a primary component that is within said second reference plane.

12. The disk drive of Claim 1, wherein said housing comprises a base plate, and wherein said actuator arm latch assembly comprises means for latching said actuator arm assembly when said disk drive is exposed to a force having a primary component that is at least generally parallel with said base plate, as well as when said disk drive its exposed to a force having a primary component that is at least generally perpendicular to said base plate.

13. The disk drive of Claim 1, wherein said actuator arm latch assembly comprises means for latching said actuator arm assembly when said disk drive is exposed to a force selected from the group consisting of a linear force, a rotational force, and any combination thereof.

14. The disk drive of Claim 1, wherein a primary axis of said latch pivot is disposed within a first reference plane that is at least generally perpendicular to a second reference plane that contains a primary axis of said actuator arm pivot.

15. The disk drive of Claim 1, wherein said actuator arm latch assembly comprises means for biasing said first latch member to a non-latching position.

16. The disk drive of Claim 1, wherein said actuator arm latch assembly comprises a second latch member fixedly mounted to said housing, whereby said second latch member does not move relative to said housing.

17. The disk drive of Claim 16, wherein said latch pivot is integrally formed with said second latch member.

18. The disk drive of Claim 16, wherein said first and second latch members are plastic.

19. The disk drive of Claim 16, wherein said first latch member comprises first cup and second cups disposed on opposite sides of said latch pivot, wherein said second latch member comprises third and fourth cups disposed on opposite sides of said latch pivot and at least generally vertically aligned with said first and second cups, respectively, wherein said actuator arm assembly latch further comprises first and second inertial masses disposed between said first and third cups and between said second and fourth cups, respectively.

20. The disk drive of Claim 16, wherein said first latch member comprises a first cup and a latch that is engageable with said actuator arm assembly, wherein said second latch member comprises a second cup, wherein said first and second cups at least generally open toward each other, wherein said actuator arm latch assembly comprises a first inertial mass disposed between said first and second cups, and wherein said first and second cups are of a different configuration.

21. The disk drive of Claim 20, wherein said second cup is at least generally trough-shaped.

22. The disk drive of Claim 20, wherein said second cup is elongated in a direction that is parallel to a portion of said first latch member that has said latch.

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23. A disk drive, comprising:

a base plate;

at least one data storage disk movably interconnected with the housing;

an actuator arm assembly movably interconnected with said housing by an
5 actuator arm pivot;

an actuator arm drive assembly interconnected with said actuator arm assembly;

a transducer interconnected with said actuator arm assembly and disposable in
alignment with said at least one data storage disk by said actuator arm drive assembly;
and

10 an actuator arm latch assembly comprising a latch pivot and a first latch member
movably mounted on the latch pivot, wherein said first latch member comprises a latch,
wherein said first latch member is movable between non-latching and latching positions
about said latch pivot, wherein said latch of said first latch member is disposed further
from said base plate when said first latch member is in said latching position versus
15 said non-latching position.

24. The disk drive of Claim 23, wherein said latch pivot is disposed in
non-parallel relation to said actuator arm pivot.

25. The disk drive of Claim 24, wherein a primary axis of said latch
pivot is disposed within a first reference plane that is at least generally perpendicular to
20 a second reference plane that contains a primary axis of said actuator arm pivot.

26. The disk drive of Claim 23, wherein said first latch member
comprises a first cup and a latch, wherein said actuator arm latch assembly further
comprises a first inertial mass that is at least partially disposed within said first cup.

27. The disk drive of Claim 26, wherein said first cup opens at least generally toward said base plate.

28. The disk drive of Claim 26, wherein said first cup comprises a planar base and an annular sidewall.

5 29. The disk drive of Claim 26, wherein said first cup comprises an annular sidewall that is disposed about a first reference axis, wherein said annular sidewall comprises a plurality of annular, planar facets having different slopes.

30. The disk drive of Claim 26, wherein said first latch member comprises a second cup, wherein said first and second cups are disposed on opposite
10 sides of said latch pivot.

31. The disk drive of Claim 30, wherein said first cup opens at least generally toward said base plate and said second cup opens at least generally away from said base plate.

32. The disk drive of Claim 23, wherein said at least one data storage
15 disk is movably interconnected with said base plate within a first reference plane, wherein a second reference plane is perpendicular to said first reference plane, and wherein said actuator arm latch assembly comprises means for latching said actuator arm assembly both when said disk drive is exposed to a force having a primary component that is within said first reference plane and when said disk drive is exposed
20 to a force having a primary component that is within said second reference plane.

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33. The disk drive of Claim 23, wherein said actuator arm latch assembly comprises means for latching said actuator arm assembly when said disk drive is exposed to a force having a primary component that is at least generally parallel with said base plate, as well as when said disk drive is exposed to a force having a primary component that is at least generally perpendicular to said base plate.

34. The disk drive of Claim 23, wherein said actuator arm latch assembly comprises means for latching said actuator arm assembly when said disk drive is exposed to a force selected from the group consisting of a linear force, a rotational force, and any combination thereof.

35. The disk drive of Claim 23, wherein said actuator arm latch assembly comprises means for biasing said first latch member to a non-latching position.

36. The disk drive of Claim 23, wherein said actuator arm latch assembly comprises a second latch member fixedly mounted to said base plate, whereby said second latch member does not move relative to said base plate.

37. The disk drive of Claim 36, wherein said latch pivot is integrally formed with said second latch member.

38. The disk drive of Claim 36, wherein said first and second latch members are plastic.

39. The disk drive of Claim 36, wherein said first latch member comprises first and second cups disposed on opposite sides of said latch pivot, wherein said second latch member comprises third and fourth cups disposed on opposite sides of said latch pivot and at least generally vertically aligned with said first and second cups, respectively, wherein said actuator arm assembly latch further comprises first and second inertial masses disposed between said first and third cups and between said second and fourth cups, respectively.

40. The disk drive of Claim 39, wherein said second cup is at least generally trough-shaped.

41. The disk drive of Claim 39, wherein said second cup defines a first cavity having a length dimension and a width dimension, wherein said length dimension is greater than said width dimension and further is greater than a diameter of said first inertial mass.

42. The disk drive of Claim 36, wherein said third cup has a different configuration than said first cup.

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43. A disk drive, comprising:

a housing;

at least one data storage disk movably interconnected with said housing;

an actuator arm assembly movably interconnected with said housing by an

5 actuator arm pivot;

an actuator arm drive assembly interconnected with said actuator arm assembly;

a transducer interconnected with said actuator arm assembly and disposable in
alignment with said at least one data storage disk by said actuator arm drive assembly;
and

10 an actuator arm latch assembly comprising a latch pivot and a first latch member
movably mounted on said latch pivot, wherein said first latch member comprises a first
cup and a latch, wherein said actuator arm latch assembly further comprises a first
inertial mass at least partially disposed within said first cup.

20 44. The disk drive of Claim 43, wherein said housing comprises a base
plate, and wherein said actuator arm latch assembly comprises a second latch member
fixedly mounted to said base plate, whereby said second latch member does not move
relative to said base plate.

45. The disk drive of Claim 44, wherein said latch pivot is integrally
formed with said second latch member.

20 46. The disk drive of Claim 44, wherein said first and second latch
members are plastic.

47. The disk drive of Claim 44, wherein said first latch member comprises a second cup, wherein said first cup and second cups are disposed on opposite sides of said latch pivot, wherein said second latch member comprises third and fourth cups disposed on opposite sides of said latch pivot and at least generally vertically aligned with said first and second cups, respectively, wherein said actuator arm assembly latch further comprises a second inertial mass, wherein said first inertial mass is disposed between said first and third cups and said second inertial mass is disposed between said second and fourth cups, respectively.

48. The disk drive of Claim 47, wherein said first cup opens at least generally toward said base plate, said second cup opens at least generally away from said base plate, said third cup opens at least generally away from said base plate, and said fourth cup opens at least generally toward said base plate.

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49. A disk drive, comprising:

a housing;

at least one data storage disk movably interconnected with said housing within a first reference plane, wherein a second reference plane is perpendicular to said first reference plane;

an actuator arm assembly movably interconnected with said housing by an actuator arm pivot;

an actuator arm drive assembly interconnected with said actuator arm assembly;

a transducer interconnected with said actuator arm assembly and disposable in alignment with said at least one data storage disk by said actuator arm drive assembly; and

an actuator arm latch assembly comprising means for latching said actuator arm assembly both when said disk drive is exposed to a force having at least a primary component that is within said first reference plane and also when said disk drive is exposed to a force having at least a primary component that is within said second reference plane.

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50. A method for reducing a potential for contact between a head and a data storage disk of a disk drive, comprising the steps of:

parking said head;

5 exposing said disk drive to a first force having at least a primary component that is at least generally parallel to said data storage disk, wherein said exposing said disk drive to a first force step is executed after said parking step;

executing a first precluding step comprising precluding said head from moving across said data storage disk as a result of said exposing said disk drive to a first force step;

10 exposing said disk drive to a second force having at least a primary component that is at least generally perpendicular to said data storage disk, wherein said exposing said disk drive to a second force step is executed after said parking step; and

15 executing a second precluding step comprising precluding said head from moving across said data storage disk as a result of said exposing said disk drive to a second force step.

51. The method of Claim 50, wherein said parking step comprises disposing said head beyond a perimeter of said data storage disk.

52. The method of Claim 50, wherein said parking step comprises disposing said head on said data storage disk.

20 53. The method of Claim 50, wherein said executing first and second precluding steps each comprise moving a latch at least generally in an upward direction.

54. The method of Claim 50, wherein said executing first and second precluding steps each comprise pivoting a latch about a first reference axis that is disposed in non-parallel relation to a data storage surface of said data storage disk.

55. The method of Claim 50, wherein said data storage disk rotates about a first reference axis, wherein said executing first and second precluding steps each comprise pivoting a latch about a second reference axis, and wherein said first and second reference axes are contained within first and second reference planes that
5 are disposed in at least generally perpendicular relation.

56. The method of Claim 50, wherein an actuator arm assembly latch comprises first and second inertial masses, wherein said executing a first precluding step uses both of said first and second inertial masses, and wherein said executing a second precluding step uses said first inertial mass but not said second inertial mass.

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